TECHNICAL NOTE

Manchester Digital Campus - Government Property Agency: Junction Assessments

SUBJECT	PROJECT NO.	DATE
Junction Assessments	100096142	5th February 2025

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TECHNICAL NOTE

1. Introduction and Context

A planning application ref 141607/FO/2024 has been lodged with Manchester City Council for the development of a new office campus comprising two office buildings (Use Class E) with some limited parking on-site for disabled users, plus cycle parking and servicing on part of the former Central Retail Park on Great Ancoats Street in Ancoats, New Islington. This new development is referred to as Manchester Digital Campus (MDC) and is being developed by the Government Property Agency (GPA).

A Transport Assessment and Travel Plan alongside all other required documents were submitted as part of the application in December 2024, the Transport Assessment forming Volume 4 Appendix 18.1 and the Framework Travel Plan for Volume 4 Appendix 18.2 of the Environmental Statement. These reports detailed the generation of new trips and the potential for reducing single occupancy car-based trips given the proximity to a high level of public transport facilities. At the time of writing those reports there was a general view held between the GPA and Manchester City Council that although there could be a sizeable generation of such car trips there would be no requirement to consider junction impacts in detail given the improvements recently made along Great Ancoats Street and that linked with the Framework Travel Plan and its subsequent development once MDC opens, use of more sustainable transport options would be encouraged; highway improvements that sought to improve matters for car users is now generally being resisted unless there are demonstrable safety issues to address.

Since submitting the documents, the City Council has requested more detail to consider the impact of the newly generated traffic associated with the proposed development. This Technical Note takes the Transport Assessment as its starting point to lead into the detail now required.

The Transport Assessment considered the overall impact at a range of junctions including those listed below and found that the junctions would experience an increase of traffic in the peak hours of 10% or less.

The junction assessments MCC have requested are for the following junctions:

- 1. Store Street / Old Mill Street / Great Ancoats Street 4-arm signalised junction;
- 2. Pollard Street / Great Ancoats Street / Adair Street 4-arm staggered signalised junction (initially requested as two separate junctions with Great Ancoats Street but they operate as one junction);
- 3. Laystall Street / Great Ancoats Street 3-arm signalised junction;
- 4. Newton Street / Great Ancoats Street 4-arm signalised junction;
- 5. Lever Street / Great Ancoats Street 4-arm signalised junction;
- 6. Oldham Street / Oldham Road/ Great Ancoats Street 4-arm signalised junction;
- 7. Oldham Road / Addington Street 3-arm signalised junction;
- 8. Rochdale Road / Angel Street/ Addington Street 4-arm signalised junction;
- 9. Corporation Street / Ring Road 4-arm signalised junction;
- 10. Cheetham Hill Road / Ring Road 3-arm signalised junction; and
- 11. Rochdale Road / Ring Road 4-arm signalised junction.

2. Junction Assessment

The twelve junctions were assessed using LinSig, the current leading software package used in studies such as this for assessing traffic signalised junctions. It combines geometric and signal timings data with traffic flow data to provide the best result in terms of minimising delays and queues by optimising 'green times'. It outputs measures of junction behaviour for each stream of traffic, queue lengths and a value relating stop line capacity to traffic demand – the Degree of Saturation (DoS); values below 90% are within desirable levels of capacity and values above 100% are when traffic exceeds capacity and queue length can grow exponentially; values between 90% and 100% are still within capacity but there is little residual capacity to account for the outliers of average traffic behaviour. Also, LinSig uses 'passenger car equivalent units' (PCUs) rather than vehicle numbers to which effectively add weighting factors to vehicles larger and heavier than cars involved (likewise vehicles smaller and lighter than cars reduce the flows assessed).

As described in the Transport Assessment, generated traffic flows were derived from the TRICs database. HFAS (TfGM's Highways Forecasting and Analytical Service team) used traffic survey data from 2023 and 2024 to form the base traffic flows and distributed the generated traffic around the wider network, mostly to and from public car parks. 50 vehicles were assigned in the peak hours to access (and egress) the on-site car park; this is a robust assessment as the 50 vehicles may not materialise every day at this car park, and they may be spread over the longer peak period and the rest of the day.

There has been no netting-off of the newly generated traffic to account for the site's previous use given that most of the trips associated with the proposed development will use off-site car parks. Additionally, the former use was active until 2019 and although traffic generation can be netted-off for 5 years afterwards, but the key aspect of parking elsewhere and the robust inclusion of 50 vehicles accessing the site in the morning peak hour (and egressing the site in the evening peak hour) has meant that no netting-off has taken place.

HFAS confirmed that cumulative traffic flows could not be fully understood from transport studies undertaken for other developments and so no traffic growth has been applied as those forecasts could be regarded as erroneous. The following junction assessments are based on observed 2024 data (with 2023 traffic being subject to some growth based on TEMPro just for one year) to provide an indication of the generated traffic impact. Traffic flows in vehicles are shown in Appendix A. As the vehicle inputs to LinSig are in PCUs, the vehicle turning movements in Appendix A have been factored by 1.1 for input to the LinSig models. This means a 10% HGV level has been applied for all base turning flows.

The following sections summarise the outputs of the junction assessments undertaken with LinSig. The LinSig outputs are provide in Appendix B.

For the junction assessment the following parameters have been compared which provide a good indication of the impacts of the proposed development:

1. Degree of Saturation (DoS %);
2. Mean Max Queue (MMQ pcu);
3. Practical Reserve Capacity (PRC %); and
4. Delay in Passenger Car Units per Hour (pcuHr).

2.1 Store Street/ Old Mill Street/ Great Ancoats Street

A summary of the junction assessment is provided in Table 1 for the base traffic, and in Table 2 for the base plus MDC development.

Table 1 - Store Street/ Old Mill Street/ Great Ancoats Street junction assessment summary - base traffic

			AM		PM	
			Cycle Time 88 secs		Cycle Time 88 secs	
			DoS (%)	Mean Max Queue (PCU)	DoS (%)	Mean Max Queue (PCU)
Zone	Link	Link Name				
A	1/1	Old Mill Street lane 1	14.7%	1.1	7.2%	0.6
	1/2	Old Mill Street lane 2	14.7%	*flare*	7.2%	*flare*
B	2/1	Great Ancoats Street (SE) lane 1	52.8%	8.4	50.8%	8.0
	2/2	Great Ancoats Street (SE) lane 2	60.4%	9.2	54.7%	6.7
	2/3	Great Ancoats Street (SE) lane 3	60.1%	*flare*	59.7%	*flare*
C	3/1	Store Street lane 1	60.0%	4.9	60.9%	6.3
	3/2	Store Street lane 2	60.0%	*flare*	60.9%	*flare*
D	4/1	Great Ancoats Street (NW) lane 1	45.7%	7.2	52.9%	7.1
	4/2	Great Ancoats Street (NW) lane 2	60.1%	7.7	62.0%	6.9
	4/3	Great Ancoats Street (NW) lane 3	60.1%	*flare*	62.0%	*flare*
			PRC 49.1%		**PRC 45.2%**	
			Delay 17.55 pcuHr		**Delay 17.71 pcuHr**	

The AM and PM base models operate on an 88 second cycle time with all stages being called each cycle. The highest DoS is on Great Ancoats Street (SE) in the AM (60.4%) and on Great Ancoats Street (NW) in the PM (62.0%).

The PRC is 49.1% and 45.2% during the AM and PM respectively, indicating that the base model has sufficient junction capacity.

Table 2 - Store Street/ Old Mill Street/ Great Ancoats Street junction assessment summary - base and proposed development traffic

			AM		PM	
			Cycle Time 88 secs		Cycle Time 88 secs	
			DoS (%)	Mean Max Queue (PCU)	DoS (%)	Mean Max Queue (PCU)
Zone	Link	Link Name				
A	1/1	Old Mill Street lane 1	16.6%	1.2	6.9%	0.6
	1/2	Old Mill Street lane 2	16.6%	*flare*	6.9%	*flare*
B	2/1	Great Ancoats Street (SE) lane 1	57.9%	9.6	52.1%	8.1
	2/2	Great Ancoats Street (SE) lane 2	65.0%	10.5	62.2%	7.3
	2/3	Great Ancoats Street (SE) lane 3	65.0%	*flare*	67.7%	*flare*
C	3/1	Store Street lane 1	64.0%	5.1	66.9%	7.3
	3/2	Store Street lane 2	64.0%	*flare*	66.9%	*flare*
D	4/1	Great Ancoats Street (NW) lane 1	45.6%	7.2	59.3%	8.5
	4/2	Great Ancoats Street (NW) lane 2	65.4%	8.4	67.9%	8.4
	4/3	Great Ancoats Street (NW) lane 3	65.4%	*flare*	67.9%	*flare*
			PRC 37.7%		**PRC 32.5%**	
			Delay 18.98 pcuHr		**Delay 19.96 pcuHr**	

The AM and PM proposed models operate on an 88 second cycle time with all stages being called each cycle. The highest DoS is on Great Ancoats Street (NW) in the AM (65.4%) and in the PM (67.9%).

The PRC is 37.7% and 32.5% during the AM and PM respectively, indicating that the proposed model has sufficient junction capacity.

2.2 Pollard Street/ Great Ancoats Street/ Adair Street

A summary of the junction assessment is provided in Table 3 for the base traffic, and in Table 4 for the base plus MDC development.

Table 3 - Pollard Street/ Great Ancoats Street/ Adair Street junction assessment summary - base traffic

			AM		PM	
			Cycle Time 88 secs		Cycle Time 88 secs	
			DoS (%)	Mean Max Queue (PCU)	DoS (%)	Mean Max Queue (PCU)
Zone	Link	Link Name				
A	2/1	Pollard Street lane 1	86.1%	16.0	69.7%	5.8
	2/2	Pollard Street lane 2	86.1%	*flare*	69.7%	*flare*
Internal	3/1	Great Ancoats Street (internal) lane 1	25.0%	0.2	18.3%	0.1
	3/2	Great Ancoats Street (internal) lane 2	52.8%	9.4	26.6%	7.3
	3/3	Great Ancoats Street (internal) lane 3	52.8%	*flare*	26.6%	*flare*
B	8/1	Great Ancoats Street (SE) lane 1	25.3%	2.9	14.3%	1.7
	8/2	Great Ancoats Street (SE) lane 2	29.8%	3.8	21.9%	3.0
C	10/1	Adair Street	66.0%	4.8	75.8%	8.5
Internal	4/1	Great Ancoats Street (internal) lane 1	58.6%	7.9	45.2%	3.8
	4/2	Great Ancoats Street (internal) lane 2	52.0%	10.8	27.1%	6.1
	4/3	Great Ancoats Street (internal) lane 3	52.0%	*flare*	0.0%	*flare*
D	6/1	Great Ancoats Street (NW) lane 1	83.6%	10.7	72.8%	8.6
	6/2	Great Ancoats Street (NW) lane 2	83.7%	11.5	74.9%	9.8
			PRC 4.5%		**PRC 18.7%**	
			Delay 31.70 pcuHr		**Delay 21.42 pcuHr**	

The AM and PM base models operate on an 88 second cycle time with all stages being called each cycle. The highest DoS is on Pollard Street in the AM (86.1%) and on Adair Street in the PM (75.8%).

The PRC is 4.5% and 18.7% during the AM and PM respectively, indicating that the base model has sufficient junction capacity.

Table 4 - Pollard Street/ Great Ancoats Street/ Adair Street junction assessment summary - base and proposed development traffic

			AM		PM	
			Cycle Time 88 secs		Cycle Time 88 secs	
			DoS (%)	Mean Max Queue (PCU)	DoS (%)	Mean Max Queue (PCU)
Zone	Link	Link Name				
A	2/1	Pollard Street lane 1	86.3%	16.1	69.7%	5.4
	2/2	Pollard Street lane 2	86.3%	*flare*	69.7%	*flare*
Internal	3/1	Great Ancoats Street (internal) lane 1	34.2%	0.3	20.6%	0.1
	3/2	Great Ancoats Street (internal) lane 2	60.2%	10.1	29.3%	9.1
	3/3	Great Ancoats Street (internal) lane 3	60.2%	*flare*	29.3%	*flare*
B	8/1	Great Ancoats Street (SE) lane 1	34.9%	4.2	14.1%	1.7
	8/2	Great Ancoats Street (SE) lane 2	34.3%	4.5	22.3%	3.0
C	10/1	Adair Street	66.0%	4.8	79.9%	9.1
Internal	4/1	Great Ancoats Street (internal) lane 1	65.3%	9.6	44.8%	3.9
	4/2	Great Ancoats Street (internal) lane 2	59.9%	13.0	28.1%	6.2
	4/3	Great Ancoats Street (internal) lane 3	59.9%	*flare*	28.1%	*flare*
D	6/1	Great Ancoats Street (NW) lane 1	85.2%	11.2	82.5%	11.2
	6/2	Great Ancoats Street (NW) lane 2	84.0%	11.6	83.9%	12.4
			PRC 4.3%		**PRC 7.3%**	
			Delay 34.71 pcuHr		**Delay 24.97 pcuHr**	

The AM and PM proposed models operate on an 88 second cycle time with all stages being called each cycle. The highest DoS is on Pollard Street in the AM (86.3%) and on Great Ancoats Street (NW) in the PM (83.9%).

The PRC is 4.3% and 7.3% during the AM and PM respectively, indicating that the proposed model has sufficient junction capacity.

2.3 Laystall Street/ Great Ancoats Street

A summary of the junction assessment is provided in Table 5 for the base traffic, and in Table 6 for the base plus MDC development.

Table 5 - Laystall Street/ Great Ancoats Street junction assessment summary - base traffic

			AM		PM	
			Cycle Time 80 secs		Cycle Time 80 secs	
			DoS (%)	Mean Max Queue (PCU)	DoS (%)	Mean Max Queue (PCU)
Zone	Link	Link Name				
A	8/1	Site Access	0.0%	0.0	0.0%	0.0
B	2/1	Great Ancoats Street (SE) lane 1	39.0%	4.8	48.3%	7.4
	2/2	Great Ancoats Street (SE) lane 2	39.4%	5.0	48.5%	7.6
C	3/1	Laystall Street lane 1	21.2%	1.0	34.1%	2.9
	3/2	Laystall Street lane 2	47.8%	2.8	57.7%	6.0
D	6/1	Great Ancoats Street (NW) lane 1	37.4%	0.3	34.4%	0.3
	6/2	Great Ancoats Street (NW) lane 2	37.1%	0.3	34.3%	0.3
E	7/1	Site Access	0.0%	0.0	0.0%	0.0
Internal	6/1	Great Ancoats Street (NW) lane 1	51.6%	7.7	57.3%	9.8
	6/2	Great Ancoats Street (NW) lane 2	51.2%	7.5	57.2%	9.7
			PRC 74.6%		PRC 56.0%	
			Delay 8.67 pcuHr		Delay 14.43 pcuHr	

The AM and PM base models operate on an 80 second cycle time with all stages being called each cycle. The highest DoS is on Great Ancoats Street (NW) in the AM (51.6%) and on Laystall Street in the PM (57.7%).

The PRC is 74.6% and 56.0% during the AM and PM respectively, indicating that the base model has sufficient junction capacity.

Table 6 - Laystall Street/ Great Ancoats Street junction assessment summary - base and proposed development traffic

			AM		PM	
			Cycle Time 80 secs		Cycle Time 80 secs	
			DoS (%)	Mean Max Queue (PCU)	DoS (%)	Mean Max Queue (PCU)
Zone	Link	Link Name				
A	8/1	Site Access	2.6%	0.1	13.2%	0.4
B	2/1	Great Ancoats Street (SE) lane 1	40.3%	5.2	49.8%	7.7
	2/2	Great Ancoats Street (SE) lane 2	40.7%	5.3	50.1%	7.8
C	3/1	Laystall Street lane 1	22.1%	1.1	35.7%	3.2
	3/2	Laystall Street lane 2	49.0%	2.9	57.6%	6.2
D	6/1	Great Ancoats Street (NW) lane 1	40.9%	0.3	36.0%	0.3
	6/2	Great Ancoats Street (NW) lane 2	38.4%	0.3	35.5%	0.3
E	7/1	Site Access	2.7%	0.0	0.5%	0.0
Internal	6/1	Great Ancoats Street (NW) lane 1	52.5%	7.9	60.3%	10.7
	6/2	Great Ancoats Street (NW) lane 2	52.9%	8.0	60.4%	10.7
			PRC 70.0%		**PRC 49.1%**	
			Delay 9.14 pcuHr		**Delay 15.70 pcuHr**	

The AM and PM proposed models operate on an 80 second cycle time with all stages being called each cycle. The highest DoS is on Great Ancoats Street (NW) in the AM (52.9%) and in the PM (60.4%).

The PRC is 70.0% and 49.1% during the AM and PM respectively, indicating that the proposed model has sufficient junction capacity.

2.4 Newton Street/ Great Ancoats Street

A summary of the junction assessment is provided in Table 7 for the base traffic, and in Table 8 for the base plus MDC development.

Table 7 - Newton Street/ Great Ancoats Street junction assessment summary - base traffic

			AM		PM	
			Cycle Time 88 secs		Cycle Time 88 secs	
			DoS (%)	Mean Max Queue (PCU)	DoS (%)	Mean Max Queue (PCU)
Zone	Link	Link Name				
A	3/1	Great Ancoats Street (SE) lane 1	66.0%	9.1	79.4%	11.9
	3/2	Great Ancoats Street (SE) lane 2	68.3%	10.6	80.9%	13.2
B	5/1	Newton Street	37.8%	2.0	79.2%	6.2
C	7/1	Great Ancoats Street (NW) lane 1	64.2%	12.3	53.1%	9.2
	7/2	Great Ancoats Street (NW) lane 2	68.9%	7.3	60.3%	6.1
	7/3	Great Ancoats Street (NW) lane 3	68.9%	*flare*	60.3%	*flare*
D	1/1	Blossom Street	67.7%	3.5	57.9%	2.8
			PRC 30.7%		**PRC 11.2%**	
			Delay 19.02 pcuHr		**Delay 22.78 pcuHr**	

The AM and PM base models operate on an 88 second cycle time with all stages being called each cycle. The highest DoS is on Great Ancoats Street (NW) in the AM (68.9%) and on Great Ancoats Street (SE) in the PM (80.9%).

The PRC is 30.7% and 11.2% during the AM and PM respectively, indicating that the base model has sufficient junction capacity.

Table 8 - Newton Street/ Great Ancoats Street junction assessment summary - base and proposed development traffic

			AM		PM	
			Cycle Time 88 secs		Cycle Time 88 secs	
			DoS (%)	Mean Max Queue (PCU)	DoS (%)	Mean Max Queue (PCU)
Zone	Link	Link Name				
A	3/1	Great Ancoats Street (SE) lane 1	64.6%	9.3	81.5%	12.4
	3/2	Great Ancoats Street (SE) lane 2	67.0%	10.9	83.0%	13.9
B	5/1	Newton Street	47.9%	2.2	82.6%	6.7
C	7/1	Great Ancoats Street (NW) lane 1	82.4%	19.1	58.9%	10.6
	7/2	Great Ancoats Street (NW) lane 2	0.0%	8.6	61.2%	6.2
	7/3	Great Ancoats Street (NW) lane 3	79.2%	*flare*	61.2%	*flare*
D	1/1	Blossom Street	69.1%	3.6	75.3%	4.1
			PRC 9.2%		**PRC 8.4%**	
			Delay 22.46 pcuHr		**Delay 25.44 pcuHr**	

The AM and PM proposed models operate on an 88 second cycle time with all stages being called each cycle. The highest DoS is on Great Ancoats Street (NW) in the AM (82.4%) and on Great Ancoats Street (SE) in the PM (83.0%).

The PRC is 9.2% and 8.4% during the AM and PM respectively, indicating that the proposed model has sufficient junction capacity.

2.5 Lever Street/ Great Ancoats Street

A summary of the junction assessment is provided in Table 9 for the base traffic, and in Table 10 for the base plus MDC development.

Table 9 - Lever Street/ Great Ancoats Street junction assessment summary - base traffic

			AM		PM	
			Cycle Time 88 secs		Cycle Time 88 secs	
			DoS (%)	Mean Max Queue (PCU)	DoS (%)	Mean Max Queue (PCU)
Zone	Link	Link Name				
B	3/1	Great Ancoats Street (SE) lane 1	41.2%	6.5	60.8%	10.7
	3/2	Great Ancoats Street (SE) lane 2	42.6%	7.2	62.3%	11.6
C	4/1	Lever Street lane 1	44.0%	2.0	55.8%	3.5
	4/2	Lever Street lane 2	50.1%	2.6	59.7%	4.3
	4/3	Lever Street lane 3	27.7%	1.3	33.2%	2.0
D	6/1	Great Ancoats Street (NW) lane 1	48.2%	7.8	47.1%	7.4
	6/2	Great Ancoats Street (NW) lane 2	49.8%	8.9	48.7%	8.3
			PRC 79.7%		PRC 44.6%	
			Delay 12.20 pcuHr		Delay 17.45 pcuHr	

The AM and PM base models operate on an 88 second cycle time with all stages being called each cycle. The highest DoS is on Lever Street in the AM (50.1%) and on Great Ancoats Street (SE) in the PM (62.3%).

The PRC is 79.7% and 44.6% during the AM and PM respectively, indicating that the base model has sufficient junction capacity.

Table 10 - Lever Street/ Great Ancoats Street junction assessment summary - base and proposed development traffic

			AM		PM	
			Cycle Time 88 secs		Cycle Time 88 secs	
			DoS (%)	Mean Max Queue (PCU)	DoS (%)	Mean Max Queue (PCU)
Zone	Link	Link Name				
B	3/1	Great Ancoats Street (SE) lane 1	42.3%	6.7	63.0%	11.3
	3/2	Great Ancoats Street (SE) lane 2	43.7%	7.5	64.5%	12.3
C	4/1	Lever Street lane 1	44.0%	2.0	55.8%	3.5
	4/2	Lever Street lane 2	50.1%	2.6	59.7%	4.3
	4/3	Lever Street lane 3	27.7%	1.3	33.2%	2.0
D	6/1	Great Ancoats Street (NW) lane 1	51.2%	8.6	47.1%	7.4
	6/2	Great Ancoats Street (NW) lane 2	53.1%	9.7	48.9%	8.4
			PRC 69.6%		PRC 39.6%	
			Delay 12.81 pcuHr		Delay 17.91 pcuHr	

The AM and PM proposed models operate on an 88 second cycle time with all stages being called each cycle. The highest DoS is on Great Ancoats Street (NW) in the AM (53.1%) and on Great Ancoats Street (SE) in the PM (64.5%).

The PRC is 69.6% and 39.6% during the AM and PM respectively, indicating that the proposed model has sufficient junction capacity.

2.6 Oldham Street/ Oldham Road/ Great Ancoats Street

A summary of the junction assessment is provided in Table 11 for the base traffic, and in Table 12 for the base plus MDC development. Oldham Road is a one-way street taking traffic away from the junction and so has no approach capacity measures in these tables.

Table 11 - Oldham Street/ Oldham Road/ Great Ancoats Street junction assessment summary - base traffic

			AM		PM	
			Cycle Time 88 secs		Cycle Time 88 secs	
			DoS (%)	Mean Max Queue (PCU)	DoS (%)	Mean Max Queue (PCU)
Zone	Link	Link Name				
A	1/1	Oldham Road lane 1	61.0%	6.1	55.9%	5.4
	1/2	Oldham Road lane 2	61.0%	*flare*	55.9%	*flare*
	1/3	Oldham Road lane 3	65.4%	7.0	83.6%	10.1
	1/4	Oldham Road lane 4	65.4%	*flare*	83.6%	*flare*
B	2/1	Great Ancoats Street (SE) lane 1	55.1%	7.6	70.8%	11.5
	2/2	Great Ancoats Street (SE) lane 2	67.5%	9.0	85.7%	12.6
	2/3	Great Ancoats Street (SE) lane 3	67.5%	*flare*	85.7%	*flare*
Internal	7/1	Oldham Road (internal) give-way	58.3%	7.6	73.7%	9.6
			PRC 33.4%		**PRC 5.0%**	
			Delay 16.18 pcuHr		**Delay 25.12 pcuHr**	

The AM and PM base models operate on an 88 second cycle time with all stages being called each cycle. The highest DoS is on Great Ancoats Street (SE) in the AM (67.5%) and in the PM (85.7%).

The PRC is 33.4% and 5.0% during the AM and PM respectively, indicating that the base model has sufficient junction capacity.

Table 12 - Oldham Street/ Oldham Road/ Great Ancoats Street junction assessment summary - base and proposed development traffic

			AM		PM	
			Cycle Time 88 secs		Cycle Time 88 secs	
			DoS (%)	Mean Max Queue (PCU)	DoS (%)	Mean Max Queue (PCU)
Zone	Link	Link Name				
A	1/1	Oldham Road lane 1	64.9%	6.7	56.0%	5.4
	1/2	Oldham Road lane 2	64.9%	*flare*	56.0%	*flare*
	1/3	Oldham Road lane 3	65.4%	7.0	87.2%	10.9
	1/4	Oldham Road lane 4	65.4%	*flare*	87.2%	*flare*
B	2/1	Great Ancoats Street (SE) lane 1	55.3%	7.7	71.7%	12.0
	2/2	Great Ancoats Street (SE) lane 2	67.8%	9.1	86.2%	12.9
	2/3	Great Ancoats Street (SE) lane 3	67.8%	*flare*	86.2%	*flare*
Internal	7/1	Oldham Road (internal) give-way	58.4%	7.6	74.3%	9.6
			PRC 32.7%		**PRC 3.2%**	
			Delay 16.52 pcuHr		**Delay 26.20 pcuHr**	

The AM and PM proposed models operate on an 88 second cycle time with all stages being called each cycle. The highest DoS is on Great Ancoats Street (SE) in the AM (67.8%) and on Oldham Road in the PM (87.2%).

The PRC is 32.7% and 3.2% during the AM and PM respectively, indicating that the proposed model has sufficient junction capacity.

2.7 Oldham Road/ Addington Street

A summary of the junction assessment is provided in Table 13 for the base traffic, and in Table 14 for the base plus MDC development.

Table 13 - Oldham Road/ Addington Street junction assessment summary - base traffic

			AM		PM	
			Cycle Time 88 secs		Cycle Time 88 secs	
			DoS (%)	Mean Max Queue (PCU)	DoS (%)	Mean Max Queue (PCU)
Zone	Link	Link Name				
A	1/1	Oldham Road (E) lane 1	79.1%	13.1	70.8%	8.6
	1/2	Oldham Road (E) lane 2	79.8%	13.5	71.8%	8.8
B	2/1	Oldham Road (W) lane 1	30.3%	2.8	75.3%	8.1
	2/2	Oldham Road (W) lane 2	30.3%	*flare*	75.3%	*flare*
C	3/1	Addington Street lane 1	20.4%	2.4	38.0%	5.0
	3/2	Addington Street lane 2	80.8%	17.7	75.7%	16.1
Internal	4/1	Oldham Road (internal) lane 1	15.4%	0.5	32.3%	1.3
	4/2	Oldham Road (internal) lane 2	14.9%	0.4	28.7%	2.3
			PRC 11.4%		**PRC 18.9%**	
			Delay 19.85 pcuHr		**Delay 20.12 pcuHr**	

The AM and PM base models operate on an 88 second cycle time with all stages being called each cycle. The highest DoS is on Addington Street in the AM (80.8%) and in the PM (75.7%).

The PRC is 11.4% and 18.9% during the AM and PM respectively, indicating that the base model has sufficient junction capacity.

Table 14 - Oldham Road / Addington Street junction assessment summary - base and proposed development traffic

			AM		PM	
			Cycle Time 88 secs		Cycle Time 88 secs	
			DoS (%)	Mean Max Queue (PCU)	DoS (%)	Mean Max Queue (PCU)
Zone	Link	Link Name				
A	1/1	Oldham Road (E) lane 1	80.9%	13.7	70.8%	8.6
	1/2	Oldham Road (E) lane 2	81.8%	14.1	71.8%	8.8
B	2/1	Oldham Road (W) lane 1	30.4%	2.8	77.0%	8.4
	2/2	Oldham Road (W) lane 2	30.4%	*flare*	77.2%	*flare*
C	3/1	Addington Street lane 1	20.4%	2.4	40.4%	5.4
	3/2	Addington Street lane 2	84.5%	19.7	75.9%	16.2
Internal	4/1	Oldham Road (internal) lane 1	15.4%	0.5	34.0%	1.4
	4/2	Oldham Road (internal) lane 2	15.0%	0.4	29.6%	2.4
			PRC 6.5%		**PRC 16.8%**	
			Delay 21.46 pcuHr		**Delay 20.57 pcuHr**	

The AM and PM proposed models operate on an 88 second cycle time with all stages being called each cycle. The highest DoS is on Addington Street in the AM (84.5%) and on Oldham Road (W) in the PM (77.2%).

The PRC is 6.5% and 16.8% during the AM and PM respectively, indicating that the proposed model has sufficient junction capacity.

2.8 Rochdale Road / Angel Street/ Addington Street

A summary of the junction assessment is provided in Table 15 for the base traffic, and in Table 16 for the base plus MDC development. Addington Street is a one-way street taking traffic away from the junction and so has no approach capacity measures in these tables.

Table 15 - Rochdale Road/ Angel Street/ Addington Street junction assessment summary - base traffic

			AM		PM	
			Cycle Time 96 secs		Cycle Time 96 secs	
			DoS (%)	Mean Max Queue (PCU)	DoS (%)	Mean Max Queue (PCU)
Zone	Link	Link Name				
A	2/1	Rochdale Road (NE) lane 1 short flare	47.5%	*flare*	55.3%	*flare*
	2/2	Rochdale Road (NE) lane 1	47.5%	5.6	55.3%	4.7
	2/3	Rochdale Road (NE) lane 2	59.3%	5.5	67.0%	5.3
	2/4	Rochdale Road (NE) lane 3	59.3%	*flare*	67.0%	*flare*
C	5/1	Rochdale Road (SW) lane 1	27.0%	1.5	52.1%	6.2
	5/2	Rochdale Road (SW) lane 2	57.9%	3.8	69.4%	7.8
	5/3	Rochdale Road (SW) lane 3	52.5%	*flare*	69.4%	*flare*
D	6/1	Angel Street lane 1	54.8%	9.6	66.0%	11.9
	6/2	Angel Street lane 2	60.8%	10.7	66.9%	13.5
	6/3	Angel Street lane 3	60.8%	*flare*	66.9%	*flare*
			PRC 48.1%		**PRC 28.8%**	
			Delay 17.51 pcuHr		**Delay 23.56 pcuHr**	

The AM and PM base models operate on a 96 second cycle time with all stages being called each cycle. The highest DoS is on Angel Street in the AM (60.8%) and on Rochdale Road (SW) in the PM (69.4%).

The PRC is 48.1% and 28.8% during the AM and PM respectively, indicating that the base model has sufficient junction capacity.

Table 16 - Rochdale Road/ Angel Street/ Addington Street junction assessment summary - base and proposed development traffic

			AM		PM	
			Cycle Time 96 secs		Cycle Time 96 secs	
			DoS (%)	Mean Max Queue (PCU)	DoS (%)	Mean Max Queue (PCU)
Zone	Link	Link Name				
A	2/1	Rochdale Road (NE) lane 1 short flare	48.7%	*flare*	58.9%	*flare*
	2/2	Rochdale Road (NE) lane 1	48.7%	6.0	58.9%	4.8
	2/3	Rochdale Road (NE) lane 2	61.7%	5.9	70.0%	5.5
	2/4	Rochdale Road (NE) lane 3	61.7%	*flare*	70.0%	*flare*
C	5/1	Rochdale Road (SW) lane 1	27.0%	1.5	53.4%	6.3
	5/2	Rochdale Road (SW) lane 2	58.4%	3.9	69.6%	7.8
	5/3	Rochdale Road (SW) lane 3	52.5%	*flare*	69.6%	*flare*
D	6/1	Angel Street lane 1	56.7%	10.0	66.1%	12.2
	6/2	Angel Street lane 2	62.5%	11.3	66.9%	13.7
	6/3	Angel Street lane 3	62.5%	*flare*	66.9%	*flare*
			PRC 43.9%		**PRC 28.6%**	
			Delay 18.20 pcuHr		**Delay 24.12 pcuHr**	

The AM and PM proposed models operate on a 96 second cycle time with all stages being called each cycle. The highest DoS is on Angel Street in the AM (62.5%) and on Rochdale Road (NE) in the PM (70.0%).

The PRC is 43.9% and 28.6% during the AM and PM respectively, indicating that the proposed model has sufficient junction capacity.

2.9 Corporation Street/ Ring Road

A summary of the junction assessment is provided in Table 17 for the base traffic, and in Table 18 for the base plus MDC development.

Table 17 - Corporation Street/ Ring Road junction assessment summary - base traffic

			AM		PM	
			Cycle Time 96 secs		Cycle Time 96 secs	
			DoS (%)	Mean Max Queue (PCU)	DoS (%)	Mean Max Queue (PCU)
Zone	Link	Link Name				
A	7/1	Corporation Street (NE) bus lane	36.3%	1.8	36.3%	1.8
B	2/1	Ring Road (SE) lane 1	47.1%	8.8	71.4%	16.8
	2/2	Ring Road (SE) lane 2	51.2%	9.5	74.2%	17.8
	2/3	Ring Road (SE) lane 3	51.2%	*flare*	74.2%	*flare*
C	4/1	Corporation Street (SW) lane 1	28.1%	*flare*	34.7%	*flare*
	4/2	Corporation Street (SW) lane 2	28.1%	2.8	34.7%	4.4
D	6/1	Ring Road (NW) lane 1	53.9%	11.6	67.2%	17.6
	6/2	Ring Road (NW) lane 2	53.9%	4.5	73.9%	5.9
			PRC 67.0%		PRC 21.2%	
			Delay 11.17 pcuHr		Delay 19.21 pcuHr	

The AM and PM base models operate on a 96 second cycle time with all stages being called each cycle apart from the Corporation Street (NE) bus lane, which is called every third cycle. This is approximately every five minutes. The highest DoS is on Ring Road (NW) in the AM (53.9%) and on Ring Road (SE) in the PM (74.2%).

The PRC is 67.0% and 21.2% during the AM and PM respectively, indicating that the base model has sufficient junction capacity.

Table 18 - Corporation Street/ Ring Road junction assessment summary - base and proposed development traffic

			AM		PM	
			Cycle Time 96 secs		Cycle Time 96 secs	
			DoS (%)	Mean Max Queue (PCU)	DoS (%)	Mean Max Queue (PCU)
Zone	Link	Link Name				
A	7/1	Corporation Street (NE) bus lane	36.3%	1.8	36.3%	1.8
B	2/1	Ring Road (SE) lane 1	48.9%	8.9	72.6%	17.4
	2/2	Ring Road (SE) lane 2	52.9%	9.5	75.2%	18.5
	2/3	Ring Road (SE) lane 3	52.9%	*flare*	75.2%	*flare*
C	4/1	Corporation Street (SW) lane 1	30.5%	*flare*	37.3%	*flare*
	4/2	Corporation Street (SW) lane 2	30.5%	2.8	37.3%	4.6
D	6/1	Ring Road (NW) lane 1	54.8%	12.1	67.7%	17.7
	6/2	Ring Road (NW) lane 2	54.7%	4.8	74.4%	5.9
			PRC 64.1%		**PRC 19.6%**	
			Delay 11.79 pcuHr		**Delay 19.99 pcuHr**	

The AM and PM proposed models operate on a 96 second cycle time with all stages being called each cycle apart from the Corporation Street (NE) bus lane, which is called every third cycle. This is approximately every five minutes. The highest DoS is on Ring Road (NW) in the AM (54.8%) and on Ring Road (SE) in the PM (75.2%).

The PRC is 64.1% and 19.6% during the AM and PM respectively, indicating that the proposed model has sufficient junction capacity.

2.10 Cheetham Hill Road/ Ring Road

A summary of the junction assessment is provided in Table 19 for the base traffic, and in Table 20 for the base plus MDC development.

Table 19 - Cheetham Hill Road/ Ring Road junction assessment summary - base traffic

			AM		PM	
			Cycle Time 96 secs		Cycle Time 96 secs	
			DoS (%)	Mean Max Queue (PCU)	DoS (%)	Mean Max Queue (PCU)
Zone	Link	Link Name				
A	1/1	Cheetham Hill Road (N) lane 1	58.1%	9.0	48.0%	6.1
	1/2	Cheetham Hill Road (N) lane 2	58.1%	*flare*	48.0%	*flare*
	1/3	Cheetham Hill Road (N) lane 3	15.2%	0.7	78.7%	7.6
	1/4	Cheetham Hill Road (N) lane 4	14.6%	*flare*	78.8%	*flare*
C	2/1	Ring Road (S) lane 1	45.0%	6.9	75.6%	18.6
	2/2	Ring Road (S) lane 2	48.2%	8.7	84.7%	18.5
D	3/1	Ring Road (W) lane 1	59.1%	*flare*	84.3%	*flare*
	3/2	Ring Road (W) lane 2	59.1%	6.8	84.3%	11.6
	3/3	Ring Road (W) lane 3	41.0%	5.7	72.6%	11.8
			PRC 52.2%		**PRC 6.3%**	
			Delay 14.61 pcuHr		**Delay 33.85 pcuHr**	

The AM and PM base models operate on a 96 second cycle time with all stages being called each cycle. The highest DoS is on Ring Road (W) in the AM (59.1%) and on Ring Road (S) in the PM (84.7%).

The PRC is 52.2% and 6.3% during the AM and PM respectively, indicating that the base model has sufficient junction capacity.

Table 20 - Cheetham Hill Road/ Ring Road junction assessment summary - base and proposed development traffic

			AM		PM	
			Cycle Time 96 secs		Cycle Time 96 secs	
			DoS (%)	Mean Max Queue (PCU)	DoS (%)	Mean Max Queue (PCU)
Zone	Link	Link Name				
A	1/1	Cheetham Hill Road (N) lane 1	60.3%	9.6	48.0%	6.1
	1/2	Cheetham Hill Road (N) lane 2	60.3%	*flare*	48.0%	*flare*
	1/3	Cheetham Hill Road (N) lane 3	15.2%	0.7	84.8%	8.5
	1/4	Cheetham Hill Road (N) lane 4	14.6%	*flare*	84.9%	*flare*
C	2/1	Ring Road (S) lane 1	45.2%	6.9	76.2%	18.8
	2/2	Ring Road (S) lane 2	49.6%	8.9	84.1%	18.6
D	3/1	Ring Road (W) lane 1	60.2%	*flare*	84.5%	*flare*
	3/2	Ring Road (W) lane 2	60.2%	7.0	84.5%	11.9
	3/3	Ring Road (W) lane 3	42.4%	6.1	72.8%	11.9
			PRC 49.2%		**PRC 6.0%**	
			Delay 15.11 pcuHr		**Delay 34.82 pcuHr**	

The AM and PM proposed models operate on a 96 second cycle time with all stages being called each cycle. The highest DoS is on Cheetham Hill Road (N) in the AM (60.3%) and in the PM (84.9%).

The PRC is 49.2% and 6.0% during the AM and PM respectively, indicating that the proposed model has sufficient junction capacity.

2.11 Rochdale Road/ Ring Road

A summary of the junction assessment is provided in Table 21 for the base traffic, and in Table 22 for the base plus MDC development.

Table 21 - Rochdale Road/ Ring Road junction assessment summary - base traffic

			AM		PM	
			Cycle Time 96 secs		Cycle Time 96 secs	
			DoS (%)	Mean Max Queue (PCU)	DoS (%)	Mean Max Queue (PCU)
Zone	Link	Link Name				
A	1/1	Rochdale Road (NE) lane 1	52.6%	5.3	59.0%	4.6
	1/2	Rochdale Road (NE) lane 2	52.8%	5.7	60.3%	5.0
	1/3	Rochdale Road (NE) lane 3	52.6%	5.0	58.2%	4.3
B	2/1	Ring Road (SE) lane 1	52.6%	*flare*	62.2%	*flare*
	2/2	Ring Road (SE) lane 2	52.6%	7.8	62.2%	10.1
	2/3	Ring Road (SE) lane 3	44.5%	8.0	56.0%	10.2
	2/4	Ring Road (SE) lane 4	13.1%	1.7	23.9%	3.2
C	3/1	Rochdale Road (SW) lane 1	47.6%	3.3	63.5%	7.5
	3/2	Rochdale Road (SW) lane 2	52.1%	4.4	63.5%	8.6
			PRC 70.4%		**PRC 41.8%**	
			Delay 17.72 pcuHr		**Delay 23.19 pcuHr**	

The AM and PM base models operate on a 96 second cycle time with all stages being called each cycle. The highest DoS is on Rochdale Road (NE) in the AM (52.8%) and on Rochdale Road (SW) in the PM (63.5%).

The PRC is 70.4% and 41.8% during the AM and PM respectively, indicating that the base model has sufficient junction capacity.

Table 22 - Rochdale Road/ Ring Road junction assessment summary - base and proposed development traffic

			AM		PM	
			Cycle Time 96 secs		Cycle Time 96 secs	
			DoS (%)	Mean Max Queue (PCU)	DoS (%)	Mean Max Queue (PCU)
Zone	Link	Link Name				
A	1/1	Rochdale Road (NE) lane 1	52.6%	5.3	59.0%	4.6
	1/2	Rochdale Road (NE) lane 2	52.8%	5.7	60.3%	5.0
	1/3	Rochdale Road (NE) lane 3	52.6%	5.0	58.2%	4.3
B	2/1	Ring Road (SE) lane 1	52.8%	*flare*	63.8%	*flare*
	2/2	Ring Road (SE) lane 2	52.8%	7.9	63.8%	10.4
	2/3	Ring Road (SE) lane 3	44.7%	8.0	57.9%	10.7
	2/4	Ring Road (SE) lane 4	13.2%	1.7	25.9%	3.4
C	3/1	Rochdale Road (SW) lane 1	47.6%	3.3	63.8%	7.5
	3/2	Rochdale Road (SW) lane 2	52.1%	4.4	64.0%	8.7
			PRC 70.4%		**PRC 40.5%**	
			Delay 17.75 pcuHr		**Delay 23.71 pcuHr**	

The AM and PM proposed models operate on a 96 second cycle time with all stages being called each cycle. The highest DoS is on Rochdale Road (NE) and Ring Road (SE) in the AM (52.8%) and on Rochdale Road (SW) in the PM (64.0%).

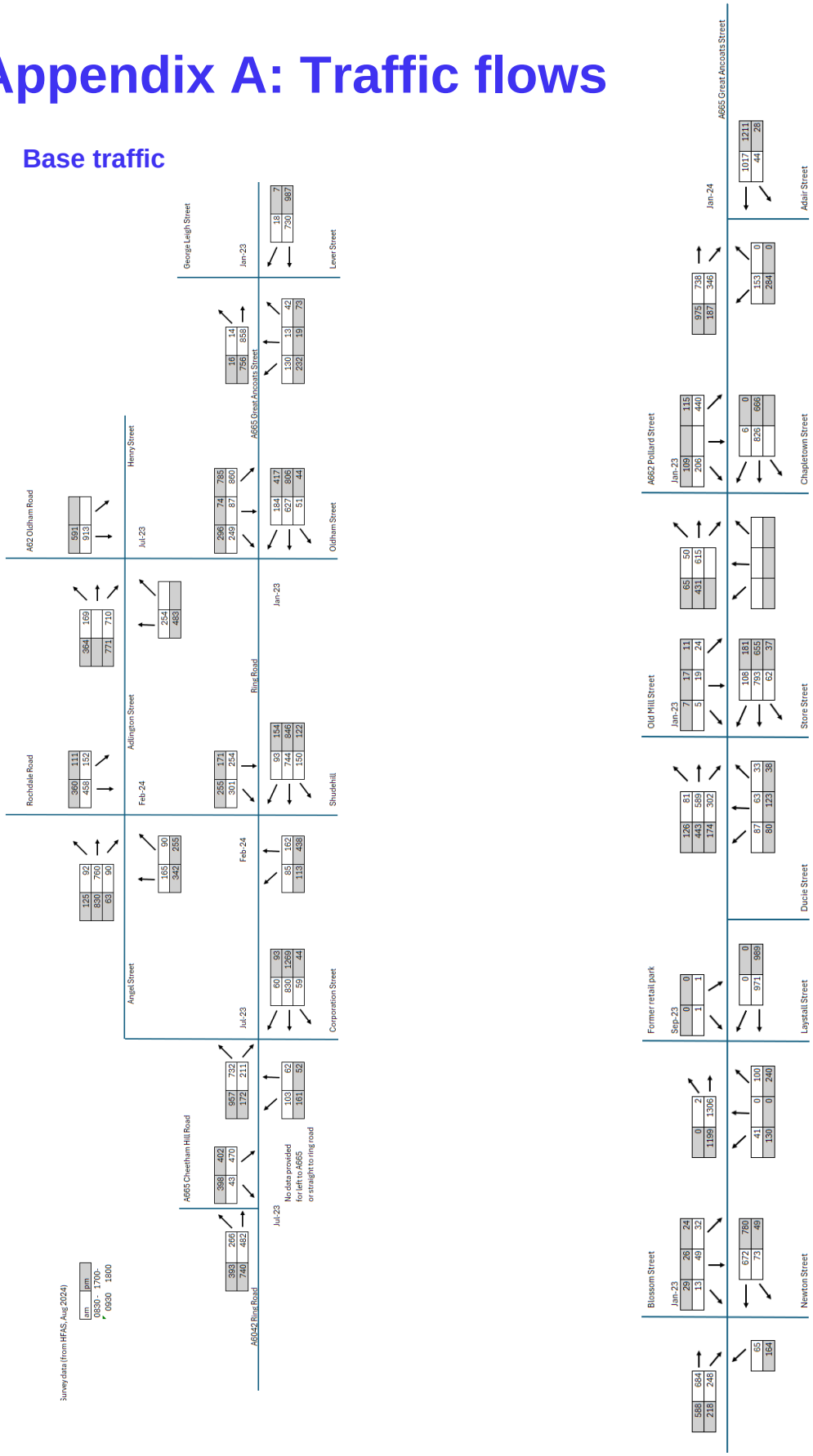
The PRC is 70.4% and 40.5% during the AM and PM respectively, indicating that the proposed model has sufficient junction capacity.

2.12 Modelling Summary

This LinSig modelling assessment has determined that each of the 11 junctions operate within capacity in both the base and proposed scenarios. Therefore, the impact of the proposed development can be accommodated within the existing junction layouts and no mitigation is required.

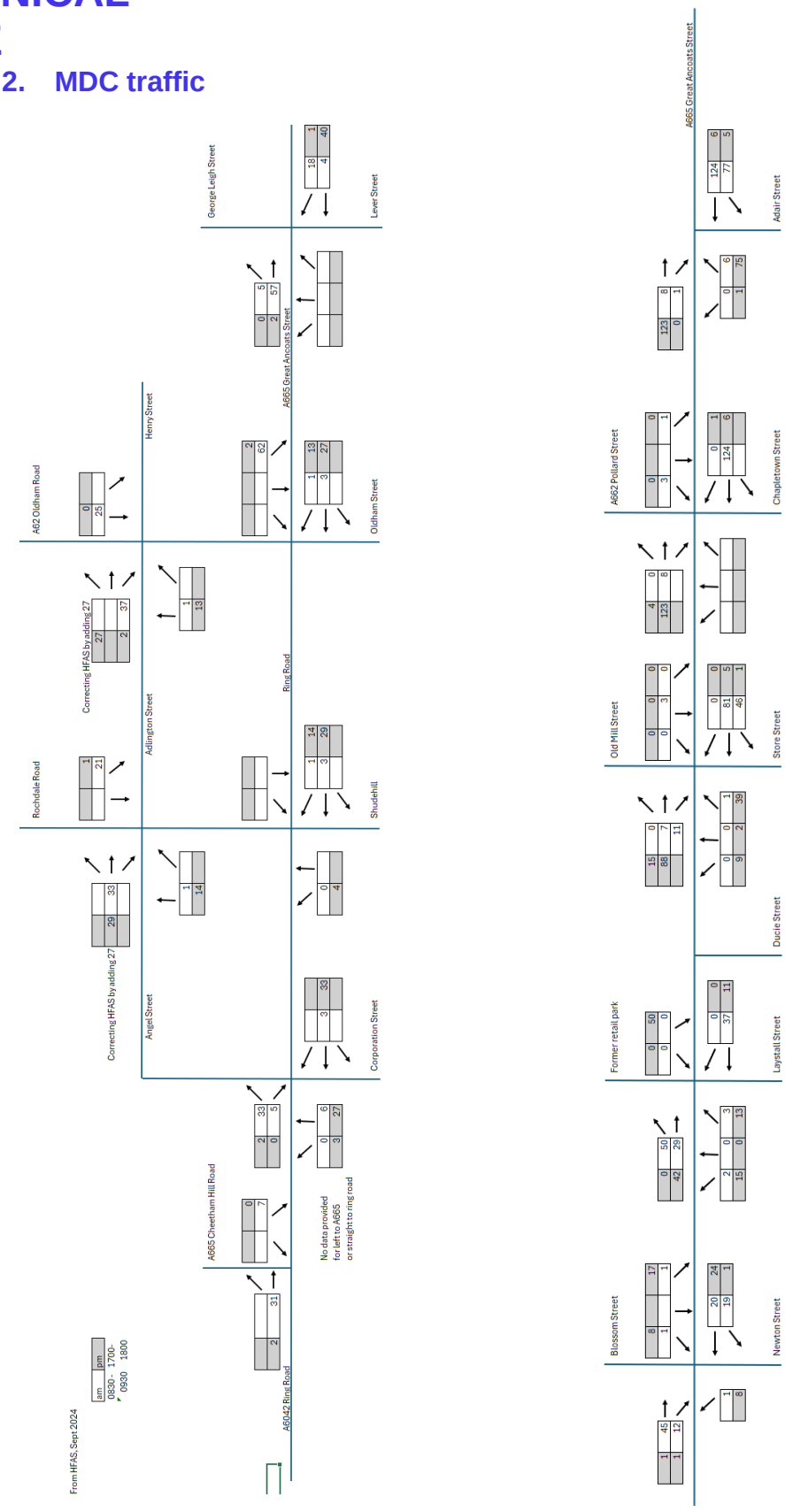
Appendix A: Traffic flows

1. Base traffic



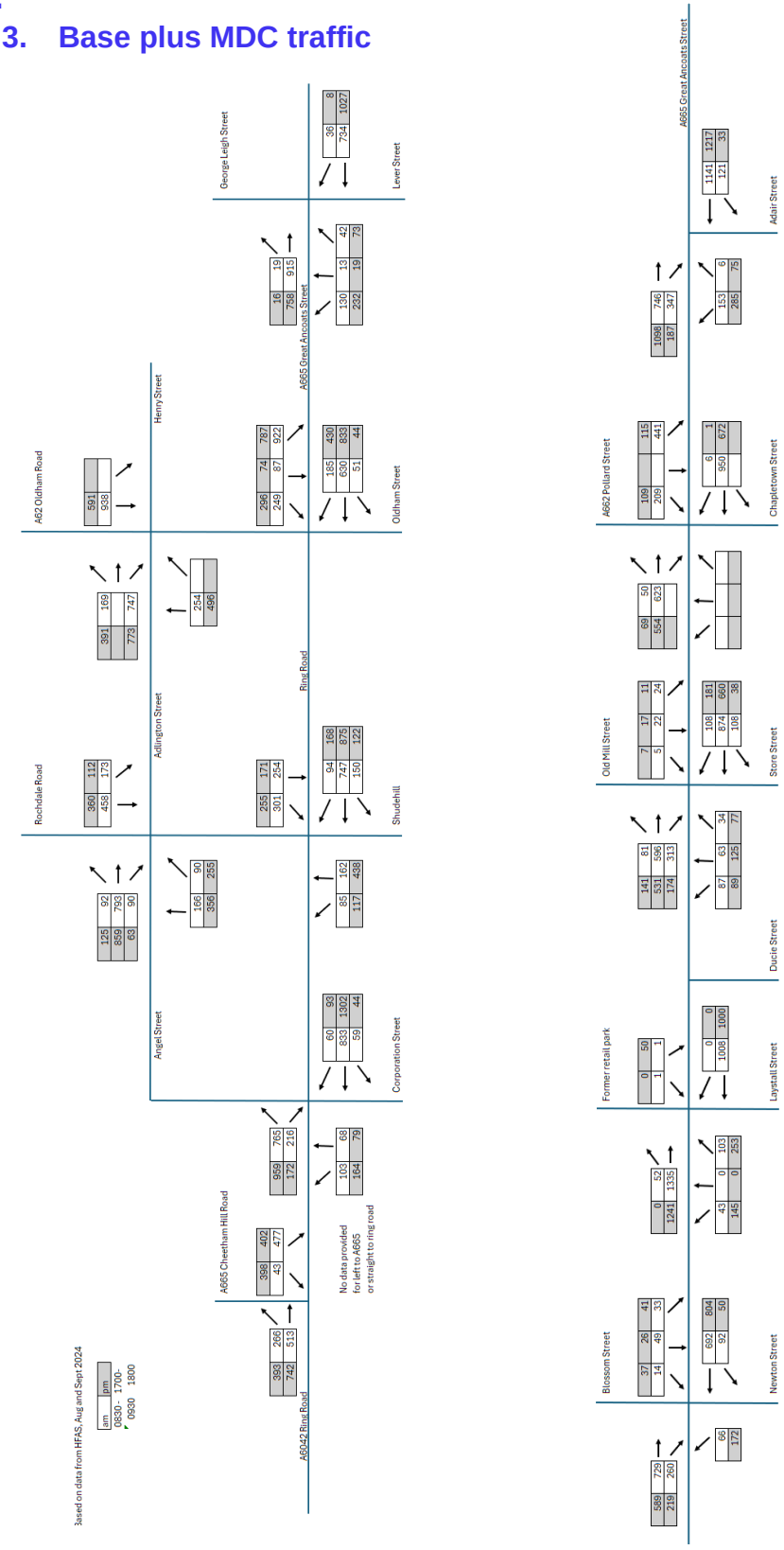
TECHNICAL NOTE

2. MDC traffic



TECHNICAL NOTE

3. Base plus MDC traffic



Appendix B: Junction assessment outputs from LinSig